**The mazef toxin-antitoxin system as an attractive target in clinical isolates of Enterococcus faecium and Enterococcus faecalis**


## ABSTRACT

The toxin-antitoxin (TA) system is a regulatory system where two sets of genes encode the toxin and its corresponding antitoxin. In this study, the prevalence of TA systems in independently isolated clinical isolates of Enterococcus faecium and Enterococcus faecalis was determined, the dominant TA system was identified, different virulence genes in E. faecium and E. faecalis were surveyed, the level of expression of the virulence and TA genes in normal and stress conditions was determined, and finally their associations with the TA genes were defined. Remarkably, the analysis demonstrated higBA and mazEF in all clinical isolates, and their locations were on chromosomes and plasmids, respectively. On the other hand, a quantitative analysis of TA and virulence genes revealed that the expression level in both genes is different under normal and stress conditions. The results obtained by anti-mazF peptide nucleic acids demonstrated that the expression level of virulence genes had decreased. These findings demonstrate an association between TA systems and virulence factors. The mazEF on the plasmids and the higBA TA genes on the chromosomes of all E. faecium and E. faecalis strains were dominant. Additionally, there was a decrease in the expression of virulence genes in the presence of anti-mazF peptide nucleic acids. Therefore, it is suggested that mazEF TA systems are potent and sensitive targets in all E. faecium and E. faecalis strains.



**Keyword:** Enterococcus faecium; Enterococcus faecalis; Toxin–antitoxin system; Virulence genes; Peptide nucleic acids